

**REMARKS**

Claims 1-4, 6-8 and 10-28 are pending in this application. Non-elected claims 11-19 have been withdrawn from consideration by the Examiner. By this Amendment, claims 1 and 7 are amended, claims 5 and 9 are canceled, and claims 25-28 are added. Support for the amendments to the claims may be found, for example, in the original claims and specification. No new matter is added.

In view of the foregoing amendments and the following remarks, reconsideration and allowance are respectfully requested.

**I. Rejection Under 35 U.S.C. §112, Second Paragraph**

Claims 5 and 9 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite. By this Amendment, the subject matter of claims 5 and 9 are respectively incorporated into claims 1 and 7, and claims 5 and 9 are canceled. Applicants respectfully traverse the rejection.

The Office Action asserts on page 2 that the claimed compositions for the first and second porcelain can be the same. This is incorrect, as claims 1 and 7 expressly recite, "the second porcelain is constituted principally by ceramic whose composition is different from that of the ceramic of the first porcelain" (emphasis added). Therefore, the claims are not indefinite.

Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

**II. Rejection Under 35 U.S.C. §102/§103**

The Office Action rejects claims 7-10 under 35 U.S.C. §102(b) as anticipated by, or in the alternative, under 35 U.S.C. §103(a) as obvious over U.S. Patent No. 6,428,614 to Brodtkin et al. ("Brodtkin"). Claim 9 is canceled, rendering its rejection moot. As to the remaining claims, Applicants respectfully traverse the rejection.

Claim 7 recites a "second porcelain that is constituted principally by ceramic whose composition is different from that of the ceramic of the first porcelain...wherein viscosity of the second porcelain at a casting temperature is lower than that of the first porcelain." While Brodtkin may disclose various compositions of porcelain, it does not disclose a kit for forming an armored portion wherein the viscosity of the second porcelain at the casting temperature is lower than that of the first porcelain.

Viscosity depends on the composition of the porcelain, specifically, the relation between  $\text{SiO}_2$  and  $\text{Al}_2\text{O}_3$  or  $\text{Na}_2\text{O}$ . Generally,  $\text{SiO}_2$  is one of the main components of glass and has a network structure. When a material contains only  $\text{SiO}_2$ , it has a firm crystal structure. For example, quartz is pure  $\text{SiO}_2$ . When a material also contains an additional component such as  $\text{Al}_2\text{O}_3$  or  $\text{Na}_2\text{O}$ , the additional component exists in the network structure at a position where the network is broken. Therefore, part of the network structure is disrupted.

The melting point corresponds to an energy amount needed to break the network structure. Therefore, the melting point is higher if glass has a firmer crystal structure. The higher the ratio of  $\text{SiO}_2$  to  $\text{Al}_2\text{O}_3$ , the higher the viscosity of the glass. Similarly, the higher the ratio of  $\text{SiO}_2$  to  $\text{Na}_2\text{O}$ , the higher the viscosity of the glass. Attached Tables A1 and A2 summarize the ratios of  $\text{SiO}_2$  to  $\text{Al}_2\text{O}_3$  and  $\text{SiO}_2$  to  $\text{Na}_2\text{O}$  in embodiments 1-10 described in the specification. Tables A1 and A2 demonstrate that in embodiments 1-10, the ratio of  $\text{SiO}_2$  to  $\text{Al}_2\text{O}_3$  in the second porcelain is lower than the ratio in the first porcelain. Tables A1 and A2 also demonstrate that in embodiments 1-7 and 11-18, the ratio of  $\text{SiO}_2$  to  $\text{Na}_2\text{O}$  in the second porcelain is lower than the ratio in the first porcelain.

Attached Table B summarizes the ratio of  $\text{SiO}_2$  to  $\text{Al}_2\text{O}_3$  and  $\text{SiO}_2$  to  $\text{Na}_2\text{O}$  disclosed in Table 6 of Brodtkin. Table 6 discloses compositional examples of body (incisal), alleged by the Office Action to correspond to the second porcelain, and opaque porcelains, alleged

to correspond to the first porcelain. *See* Brodkin at col. 5, lines 26-27. As shown in Table B, in Example 1, the ratio of SiO<sub>2</sub> to Al<sub>2</sub>O<sub>3</sub> is 5.3. In Example 2, the ratio is 4.4. When the body porcelain (Example 1) and the opaque porcelains (Examples 3-5) in Brodkin are observed, the ratios of the body porcelain are larger than that of the opaque porcelains. Table B also demonstrates that the ratio of SiO<sub>2</sub> to Na<sub>2</sub>O of the regular porcelain is higher than the ratio of the opaque porcelains. Therefore, it is impossible for the two porcelains forming the two layers described in Brodkin to have a viscosity of the second layer lower than that of the first layer.

Brodkin does not anticipate and would not have rendered obvious claim 7 because it does not disclose a second porcelain having a viscosity lower than that of a first porcelain. Claims 8-10 variously depend from claim 7, and, thus, also are not anticipated or would have been rendered obvious by Brodkin. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

### **III. Rejections Under 35 U.S.C. §103(a)**

#### **A. Janjic, Brodkin, And Sozio**

Claims 1, 3-6 and 20-22 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 3,934,348 to Janjic in view of Brodkin and U.S. Patent No. 4,585,417 to Sozio et al. ("Sozio"). Claim 5 is canceled, rendering its rejection moot. As to the remaining claims, Applicants respectfully traverse the rejection.

Claim 1 recites that "the second porcelain is constituted principally by ceramic whose composition is different from that of the ceramic of the first porcelain such that a viscosity of the second porcelain at the casting temperature is lower than that of the first porcelain." The Office Action, on page 6, concedes that Janjic does not teach a second porcelain constituted by a ceramic whose composition is different than that of the ceramic of the first porcelain such that the viscosity is lower.

The Office Action relies on Brodtkin to make up for this deficiency of Janjic. As discussed above, Brodtkin does not teach a second porcelain with a viscosity lower than that of the first porcelain. The Office Action provides no suggestion or basis for concluding that Sozio cures the above-noted deficiencies of Brodtkin.

The Office Action, on page 8, also concedes that the combination of Janjic and Brodtkin do not teach how the regular porcelain layer (second porcelain layer) is added to the first porcelain layer. The Office Action relies on Sozio to make up for the deficiency of Janjic and Brodtkin. Applicants respectfully disagree.

Claim 1, as amended, relates to a method of manufacturing a dental prosthesis. Claim 1 requires "forming a cast coating layer on at least a part of a surface of the back coating layer, by pouring a second porcelain, which is held by a ceramic holding portion provided with the casting mold and is softened by heating with the casting mold, into the void of the casting mold via the porcelain introducing passage **under pressure** using the casting mold heated to a casting temperature to form at least two coating layers including the back coating layer and the cast coating layer on the surface of the substrate" (emphasis added).

Sozio teaches in Fig. 1 that the opening 28 is formed in the mold block 20 and teaches in Fig. 4 that the opening 44 is formed in the mold block 40. However, Sozio does not describe that the shrink-free ceramic material is supplied into the void **under pressure**. In the recited method of manufacturing a dental prosthesis, when a softened second porcelain is poured into a void of a casting mold via a porcelain inducing passage to form a cast coating layer on at least a part of the surface of the back coating layer, the second porcelain is introduced into the void under pressure using something like a plunger. *See* claim 1 and specification at paragraph [0087].

Therefore, the combination of Janjic, Brodtkin, and Sozio would not have rendered obvious claim 1. Claims 3-6 and 20-22 depend from claim 1 and, thus, also would not have been rendered obvious by Janjic, Brodtkin, and Sozio.

Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

**B. Janjic, Brodtkin, Sozio, And Fukuda**

Claims 2 and 24 are rejected under 35 U.S.C. §103(a) as being unpatentable over Janjic, Brodtkin, Sozio, and further in view of Japanese Patent Publication No. 06-269466 to Fukuda et al. ("Fukuda"). Applicants respectfully traverse the rejection.

The Office Action provides no suggestion or basis for concluding that Fukuda cures the above-noted deficiencies of the combination of Janjic, Brodtkin, and Sozio with respect to claim 1. Accordingly, claims 2 and 24 are patentably distinct from the asserted combination at least because of their dependence from claim 1, as well as on the basis of their additional limitations.

Reconsideration and withdrawal of the rejection are respectfully requested.

**C. Janjic And Brodtkin**

Claims 7-10 are rejected under 35 U.S.C. §103(a) as being unpatentable over Janjic in view of Brodtkin. Claim 9 is canceled, rendering its rejection moot. As to the remaining claims, Applicants respectfully traverse the rejection.

The Office Action concedes that Janjic does not teach a second porcelain constituted by a ceramic whose composition is different than that of the ceramic material of the first porcelain such that the viscosity of the second porcelain is lower than that of the first porcelain at the same casting temperature. As discussed above, Brodtkin does not teach this feature. Therefore, claim 7 would not have been obvious over the combination of

Janjic and Brodtkin. Claims 8-10 depend from claim 7 and, thus, also would not have been rendered obvious by Janjic and Brodtkin.

Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

#### **IV. New Claims**

By this Amendment, new claims 25-28 are presented. The new claims are believed to be patentable over the applied references at least because of their dependence from either claims 1 or 7, as well as for their additional limitations. Prompt examination and allowance of new claims 25-28 are respectfully requested.

New claims 25 and 27 recite a ratio of  $\text{SiO}_2$  to  $\text{Al}_2\text{O}_3$  of the second porcelain is lower than the ratio of  $\text{SiO}_2$  to  $\text{Al}_2\text{O}_3$  of the first porcelain. As discussed above, Tables A1, A2, and B demonstrate that the applied references do not teach a second porcelain with a ratio lower than that of the first porcelain. Therefore, claims 25 and 27 are patentable over the applied references.

New claims 26 and 28 recite a second porcelain with a ratio of  $\text{SiO}_2$  to  $\text{Na}_2\text{O}$  lower than the ratio of  $\text{SiO}_2$  to  $\text{Na}_2\text{O}$  of the first porcelain. As discussed above, Tables A1, A2, and B demonstrate that the applied references do not teach a second porcelain with this ratio lower than that of the first porcelain. Therefore, claims 26 and 28 are patentable over the applied references.

Accordingly, examination and prompt allowance of the new claims are earnestly solicited.

#### **V. Conclusion**

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of the application are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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Attachments:

Petition for Extension of Time  
Tables A1, A2, and B

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